

## CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

1 1. A method for manipulating a graphical display, the method comprising the  
2 steps of:

3 providing a graphical user interface comprising a first portion for providing a  
4 graphical display, the graphical display comprising a plurality of image objects;

5 receiving a user selection of a first image object in the first portion of the  
6 graphical user interface;

7 displaying a target area containing the first image object selected;

8 receiving a user selection of a second image object in the first portion of the  
9 graphical user interface; and

10 modifying the displayed target area such that the target area contains the first  
11 and second image objects.

1 2. The method of claim 1, wherein the step of modifying the displayed target area  
2 comprises centering the target area with respect to the first and second image objects  
3 selected.

1 3. The method of claim 1, wherein the step of modifying the displayed target area  
2 comprises displaying the target area such that the first and second image objects are  
3 contained within the target area and a maximum number of the image objects not  
4 selected are contained in the target area.

1 4. The method of claim 1, wherein the target area comprises a square.

1 5. The method of claim 1, wherein the step of receiving a user selection of a first  
2 image object and the step of receiving a user selection of a second image object is via  
3 a cursor manipulated by a mouse.

1 6. A method for manipulating a graphical display of a printed circuit board  
2 model, the printed circuit board model adapted to be used in an automated x-ray  
3 inspection system for detecting defects in a manufactured printed circuit board having  
4 one or more components comprising one or more pins soldered to the printed circuit  
5 board, the method comprising the steps of:  
6 providing a graphical user interface comprising a first portion for providing a  
7 graphical display of a printed circuit board model comprising a plurality of image  
8 objects associated with a printed circuit board;  
9 receiving a user selection of a first image object in the first portion of the  
10 graphical user interface;  
11 displaying a target area containing the first image object selected;  
12 receiving a user selection of a second image object in the first portion of the  
13 graphical user interface; and  
14 modifying the displayed target area such that the target area contains the first  
15 and second image objects.

1 7. The method of claim 6, wherein the step of modifying the displayed target area  
2 comprises centering the target area with respect to the first and second image objects  
3 selected.

1 8. The method of claim 6, wherein the step of modifying the displayed target area  
2 comprises displaying the target area such that the first and second image objects are  
3 contained within the target area and a maximum number of the image objects not  
4 selected are contained in the target area.

1 9. The method of claim 6, wherein at least one of the plurality of image objects  
2 comprises a family object that specifies a type of solder joint.

1 10. The method of claim 6, wherein at least one of the plurality of image objects  
2 comprises a package object that specifies a type of component.

1 11. The method of claim 6, wherein at least one of the plurality of image objects  
2 comprises a pin object that specifies a unique pin number for a specific component in  
3 the printed circuit board.

1 12. The method of claim 6, wherein the target area comprises a square.

1 13. The method of claim 6, wherein the step of receiving a user selection of a first  
2 image object and the step of receiving a user selection of a second image object is via  
3 a cursor manipulated by a mouse.

1 14. A computer program embodied in a computer-readable medium for  
2 manipulating a graphical display, the computer program comprising logic configured  
3 to:

4 provide a graphical user interface comprising a first portion for providing a  
5 graphical display, the graphical display comprising a plurality of image objects;

6 receive a user selection of a first image object in the first portion of the  
7 graphical user interface;

8 display a target area containing the first image object selected;

9 receive a user selection of a second image object in the first portion of the  
10 graphical user interface; and

11 modify the displayed target area such that the target area contains the first and  
12 second image objects.

1 15. The computer program of claim 14, wherein the logic is further configured to  
2 modify the displayed target area by centering the target area with respect to the first  
3 and second image objects selected.

1 16. The computer program of claim 14, wherein the logic is further configured to  
2 modify the displayed target area by displaying the target area such that the first and  
3 second image objects are contained within the target area and a maximum number of  
4 the image objects not selected are contained in the target area.

1 17. The computer program of claim 14, wherein the target area comprises a  
2 square.

1 18. The computer program of claim 14, wherein the logic is further configured to  
2 receive the user selection of a first image object and a second image object via a  
3 cursor manipulated by a mouse.

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1     19.     A computer program embodied in a computer-readable medium for  
2     manipulating a graphical display of a printed circuit board model, the printed circuit  
3     board model adapted to be used in an automated x-ray inspection system for detecting  
4     defects in a manufactured printed circuit board having one or more components  
5     comprising one or more pins soldered to the printed circuit board, the computer  
6     program comprising logic configured to:  
7             provide a graphical user interface comprising a first portion for providing a  
8     graphical display of a printed circuit board model comprising a plurality of image  
9     objects associated with a printed circuit board;  
10            receive a user selection of a first image object in the first portion of the  
11     graphical user interface;  
12            display a target area containing the first image object selected;  
13            receive a user selection of a second image object in the first portion of the  
14     graphical user interface; and  
15            modify the displayed target area such that the target area contains the first and  
16     second image objects.

1     20.     The computer program of claim 19, wherein the logic is further configured to  
2     modify the displayed target area by centering the target area with respect to the first  
3     and second image objects selected.

1 21. The computer program of claim 19, wherein the logic is further configured to  
2 modify the displayed target area by displaying the target area such that the first and  
3 second image objects are contained within the target area and a maximum number of  
4 the image objects not selected are contained in the target area.

1 22. The computer program of claim 19, wherein at least one of the plurality of  
2 image objects corresponds to a solder joint.

1 23. The computer program of claim 19, wherein at least one of the plurality of  
2 image objects corresponds to a component.

1 24. The computer program of claim 19, wherein at least one of the plurality of  
2 image objects corresponds to a pin.

1 25. The computer program of claim 20, wherein the target area comprises a  
2 square.

1 26. The computer program of claim 19, wherein the logic is further configured to  
2 receive the user selection of a first image object a second image via a cursor  
3 manipulated by a mouse.



- 1    27.    A system for manipulating a graphical display of a printed circuit board model,  
2    the printed circuit board model adapted to be used in an automated x-ray inspection  
3    system for detecting defects in a manufactured printed circuit board having one or  
4    more components comprising one or more pins soldered to the printed circuit board,  
5    the system comprising:
- 6            a means for providing a graphical user interface comprising a first portion for  
7    providing a graphical display of a printed circuit board model comprising a plurality  
8    of image objects associated with a printed circuit board;
- 9            a means for receiving a user selection of one or more of the image objects in  
10   the first portion of the graphical user interface; and
- 11           a means for displaying a target area such that the target area contains one or  
12   more image objects selected and a maximum number of the image objects not selected  
13   are contained in the target area.

1 28. A system for manipulating a graphical display of a printed circuit board model,  
2 the printed circuit board model adapted to be used in an automated x-ray inspection  
3 system for detecting defects in a manufactured printed circuit board having one or  
4 more components comprising one or more pins soldered to the printed circuit board,  
5 the system comprising:

6 logic configured to:

7 provide a graphical user interface comprising a first portion for  
8 providing a graphical display of a printed circuit board model comprising a  
9 plurality of image objects associated with a printed circuit board;

10 receive a user selection of a first image object in the first portion of the  
11 graphical user interface;

12 display a target area containing the first image object selected;

13 receive a user selection of a second image object in the first portion of  
14 the graphical user interface; and

15 modify the displayed target area such that the target area contains the  
16 first and second image objects;

17 a processing device configured to implement the logic; and

18 a display device configured to support the graphical user interface

1 29. The system of claim 28, wherein the logic is further configured to modify the  
2 displayed target area by centering the target area with respect to the first and second  
3 image objects selected.

1 30. The system of claim 28, wherein the logic is further configured to modify the  
2 displayed target area by displaying the target area such that the first and second image  
3 objects are contained within the target area and a maximum number of the image  
4 objects not selected are contained in the target area.

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1 31. The system of claim 28, wherein at least one of the plurality of image objects  
2 corresponds to a solder joint.

1 32. The system of claim 28, wherein at least one of the plurality of image objects  
2 corresponds to a component.

1 33. The system of claim 28, wherein at least one of the plurality of image objects  
2 corresponds to a pin.

1 34. The system of claim 29, wherein the target area comprises a square.

1 35. The system of claim 28, wherein the logic is further configured to receive the  
2 user selection of a first image object a second image via a cursor manipulated by a  
3 mouse.